

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 E21B7/18 B65G54/02 B03C1/12 E21B21/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E21B B65G B03C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 20 52 516 A (SELLNOW W) 27 April 1972 (1972-04-27) page 2, line 7 - line 17	1,7,8
Y	page 4, line 1 - line 15 page 5, line 14 - line 21 page 6, line 22 - page 7, line 12; figures 1,3	2-6,9-16
X	DE 28 32 037 A (CANON KK) 31 January 1980 (1980-01-31) figures 1,3	1
X	US 3 952 857 A (NAZUKA IWAO) 27 April 1976 (1976-04-27) figures 1,4A,4B	1-4,7
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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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& document member of the same patent family

Date of the actual completion of the international search

13 September 2004

Date of mailing of the international search report

24/09/2004

Name and mailing address of the ISA

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 02/34653 A (SHELL CANADA LTD ;SHELL INT RESEARCH (NL)) 2 May 2002 (2002-05-02) cited in the application the whole document -----	2-4, 9, 13-15
Y	US 3 489 280 A (MERWIN ROBERT F ET AL) 13 January 1970 (1970-01-13) figures 3,5 -----	5,6
Y	US 5 170 891 A (BARRETT WILLIAM T) 15 December 1992 (1992-12-15) column 7, line 13 - line 26; figure 6 -----	11,12,17
A	US 6 412 643 B1 (WYSOLMIERSKI ROBERT T) 2 July 2002 (2002-07-02) the whole document -----	
Y	US 4 993 503 A (MANN THOMAS H ET AL) 19 February 1991 (1991-02-19) column 5, line 18 - line 24 -----	16
Y	US 6 510 907 B1 (BLANGE JAN JETTE) 28 January 2003 (2003-01-28) column 1, line 42 - line 58 column 5, line 8 - line 18; figures 1,4,5 column 4, line 58 - line 61 -----	10,17,18
Y	US 3 831 753 A (GAYLORD E ET AL) 27 August 1974 (1974-08-27) -----	18
A	column 2, line 4 - line 12 column 2, line 55 - line 56; figure 2 -----	16
A	US 3 375 886 A (MORI ERNEST A ET AL) 2 April 1968 (1968-04-02) the whole document -----	18

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 2052516	A	27-04-1972	DE 2052516 A1	27-04-1972
DE 2832037	A	31-01-1980	DE 2832037 A1	31-01-1980
			JP 55043783 U	21-03-1980
US 3952857	A	27-04-1976	JP 50125368 A	02-10-1975
			CH 583607 A5	14-01-1977
			DD 114935 A5	05-09-1975
			DE 2438972 A1	25-09-1975
WO 0234653	A	02-05-2002	AU 2179102 A	06-05-2002
			BR 0114894 A	12-08-2003
			CA 2427090 A1	02-05-2002
			CN 1471489 T	28-01-2004
			EA 4028 B1	25-12-2003
			EG 22760 A	30-07-2003
			WO 0234653 A1	02-05-2002
			EP 1328458 A1	23-07-2003
			NO 20031863 A	25-04-2003
			US 2002079998 A1	27-06-2002
US 3489280	A	13-01-1970	DE 1257701 B	04-01-1968
			FR 1510384 A	19-01-1968
			GB 1140794 A	22-01-1969
US 5170891	A	15-12-1992	NONE	
US 6412643	B1	02-07-2002	CA 2438862 A1	06-09-2002
			EP 1379334 A1	14-01-2004
			WO 02068124 A1	06-09-2002
US 4993503	A	19-02-1991	NONE	
US 6510907	B1	28-01-2003	AU 762490 B2	26-06-2003
			AU 4564300 A	17-11-2000
			BR 0010111 A	19-02-2002
			CA 2384305 A1	09-11-2000
			CN 1349585 T	15-05-2002
			EA 2542 B1	27-06-2002
			EG 22653 A	31-05-2003
			WO 0066872 A1	09-11-2000
			EP 1175546 A1	30-01-2002
			NO 20015170 A	23-10-2001
US 3831753	A	27-08-1974	CA 1016474 A1	30-08-1977
US 3375886	A	02-04-1968	DK 109441 C	29-04-1968
			GB 1086537 A	11-10-1967
			NO 117738 B	22-09-1969
			US 3399739 A	03-09-1968